Parallel Pair Puzzle

Sort quadrilaterals by their opposite sides.

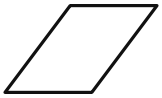
G.2D.1 "Discover, evaluate, and analyze the relationships between lines, angles, and polygons to solve real-world and mathematical problems; express proofs in a form that clearly justifies the reasoning (e.g., two-column proofs, paragraph proofs..."

NAME _____ DATE _____

TWO PARALLEL PAIRS

Both pairs of opposite sides are parallel. Each pair of sides runs in the same direction.

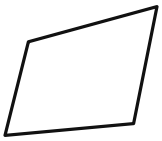
Both pairs of opposite sides are parallel in this quadrilateral.



FEWER THAN TWO PARALLEL PAIRS

At least one pair of opposite sides is not parallel. The quadrilateral may have one parallel pair or none.

Neither pair of opposite sides is parallel in this quadrilateral.



1 SORT

8 items

For each figure, circle BOTH or OTHER; then, in Part 2, pick one figure from each category and explain how its opposite sides support your choice.

1.



Figure 1

BOTH OTHER

2.

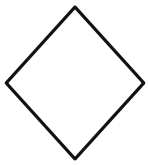


Figure 2

BOTH OTHER

3.

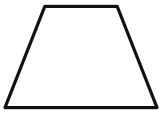


Figure 3

BOTH **OTHER**

4.

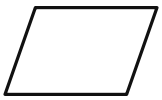


Figure 4

BOTH **OTHER**

5.

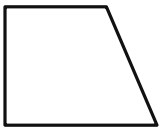


Figure 5

BOTH **OTHER**

6.

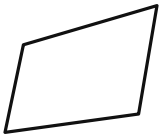


Figure 6

BOTH **OTHER**

7.

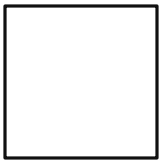


Figure 7

BOTH **OTHER**

8.

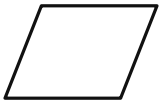


Figure 8

BOTH **OTHER**

2 PROVE IT

Explain your thinking

Pick one figure from each category and explain how its opposite sides support your choice.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Give the vertices, in order, of one new quadrilateral for BOTH and one for OTHER. Name any pairs of parallel opposite sides.

BOTH _____

OTHER _____

CHALLENGE

A quadrilateral has vertices A(0, 0), B(6, 0), C(x, 4), and D(2, 4), in that order. Find x so it belongs to BOTH. Use slopes to justify your answer.

ANSWER KEY

Parallel Pair Puzzle

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Figure 1 (rectangle)	**BOTH**	Each pair of opposite sides is parallel.
2	Figure 2 (rhombus)	**BOTH**	A rhombus has two pairs of parallel opposite sides.
3	Figure 3 (trapezoid)	**OTHER**	Only one pair of opposite sides is parallel.
4	Figure 4 (polygon)	**BOTH**	The top and bottom sides are parallel, and the two slanted sides are parallel.
5	Figure 5 (right_trapezoid)	**OTHER**	Only one pair of opposite sides is parallel.
6	Figure 6 (polygon)	**OTHER**	Neither pair of opposite sides is parallel.
7	Figure 7 (square)	**BOTH**	Each pair of opposite sides is parallel.
8	Figure 8 (parallelogram)	**BOTH**	Both pairs of opposite sides are parallel.

PART 2 · PROVE IT

Task: Pick one figure from each category and explain how its opposite sides support your choice. Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **BOTH**: A(0, 0), B(5, 0), C(7, 4), D(2, 4). AB is parallel to CD, and BC is parallel to DA.
- **OTHER**: A(0, 0), B(6, 0), C(4, 3), D(1, 3). AB is parallel to CD, but BC is not parallel to DA.

Challenge: x = 8. AB and CD both have slope 0. When C is (8, 4), BC has slope 4/2 = 2 and DA has slope 4/2 = 2, so both pairs of opposite sides are parallel.

Part 2 explanations should identify both pairs of opposite sides, including the pair that is not parallel in an OTHER figure. Accept different Part 3 coordinates when they form valid quadrilaterals and support the stated classifications.